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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ORTIZ, BELIX M	
ART UNIT	**PAPER NUMBER**
2164	

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,371	SAWDON ET AL.	
	Examiner	Art Unit	
	Belix M. Ortiz	2164	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/22/2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

SAM RIMELL
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. In response to communications files on 22-November-2004, claim 1 is cancelled; the specification of the disclosure; and new claims 2-16 are added per applicant's request. Therefore, claims 2-16 are presently pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Kazar et al. (U.S. publication 2002/0112022) in view of Howard (U.S. publication 2002/0078244).

As to claim 1, Kazar et al. teaches a method for updating modifying a file system snapshot (see paragraph 100), comprising:

determining if an inode to be modified in the specified snapshot is an empty inode (see figure 1 and paragraphs 82 and 84);

copying, in response to determining a inode to be modified is an empty inode, metadata corresponding to the inode to be modified into the inode to be modified (see figures 1 and 8-9 and paragraphs 20-21, 73, and 85);

writing the metadata into a next oldest file system snapshot (see paragraph 69); and

modifying the metadata copied into the inode to be modified (see paragraph 55).

Kazar et al. does not teach accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

Howard teaches object-based storage device with improved reliability and fast crash recovery (see abstract), in which he teaches accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system (see paragraphs 7 and 24).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., to include accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., by the teaching of Howard, because accessing a specified file system snapshot in a plurality of file system snapshots, wherein

the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system, would enable the method because, "Accordingly, the amount of data transmitted between the client and the storage may be reduced. Furthermore, client locking of blocks during updating may be eliminated", (see Howard, paragraph 24).

As to claim 2, Kazar et al. as modified teaches wherein the metadata includes any one of:

at least one shadow inode, at least one indirect block referenced by a shadow inode and at least one data block referenced by a disk address in an indirect block (see Kazar et al., paragraphs 74 and 79-80).

As to claims 3 and 19, Kazar et al. as modified teaches the method further comprising:

updating the metadata of the specified file system snapshot in accordance with modifications to at least one source file corresponding to the fist specified file system snapshot (see Kazar et al., paragraphs 60 and 87).

As to claims 4, 12, and 20, Kazar et al. as modified teaches the method further comprising:

accessing a next most recent file system snapshot (see Kazar et al., paragraph 87);

copying the a next metadata of the next most recent file system snapshot (see Kazar et al., paragraph 87), wherein the next metadata contents includes any one of:

at least one shadow inode and at least one data block referenced by a disk address in a shadow inode (see Kazar et al., paragraphs 60 and 68); and

at least one shadow inode (see Kazar et al., paragraph 22), and

writing the next metadata which have been copied to the specified file system snapshot (see Kazar et al., paragraph 60 and 69).

As to claims 5, 13, and 21, Kazar et al. as modified teaches the method further comprising writing the next metadata into the next oldest file system snapshot (see Kazar et al., paragraph 69).

As to claim 6, Kazar et al. teaches a method for modifying snapshot data (see abstract), comprising:

accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one inode comprising at least one ditto address, wherein the at least one ditto address refers to a data block that has a disk address in an inode associated with one of a more recent snapshot and a source file system (see paragraphs 68-69 and 71);

determining if a data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot (see paragraph 68);

copying, in response to determining the data block to be modified is referenced by a ditto address in an inode of the specked file system snapshot, the data block to be modified into the specified snapshot (see paragraphs 20-21, 70, 73-75, and 79-80);

copying the data block to be modified into a next oldest file system snapshot (see paragraph 69); and

modifying the data block copied into the specified snapshot (see paragraph 69).

As to claims 7 and 23, Kazar et al. teaches the method further comprising:

wherein the copying a data block to be modified comprises reading an indirect block referenced by the disk address and at least one data block referenced by at least one disk address in the indirect block (see paragraphs 74 and 79-80).

As to claims 8 and 24, Kazar et al. teaches the method further comprising:

wherein the copying a data block to be modified comprises accessing one of more recent snapshot dataset and the source file system to read the metadata (see paragraph 60).

As to claim 9, Kazar et al. teaches a system for modifying a file system snapshot (see paragraph 100), comprising:

means for determining if an inode to be modified in the specified snapshot is an empty inode (see figure 1 and paragraphs 82 and 84);

means for copying, in response to determining a inode to be modified is an empty inode, metadata corresponding to the inode to be modified into the inode to be modified (see figures 1 and 8-9 and paragraphs 20-21, 73, and 85);

means for writing the metadata into a next oldest file system snapshot (see paragraph 69); and

means for modifying the metadata copied into the inode to be modified (see paragraph 55).

Kazar et al. does not teach means for accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

Howard teaches object-based storage device with improved reliability and fast crash recovery (see abstract), in which he teaches means for accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system (see paragraphs 7 and 24).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., to include means for accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one

empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., by the teaching of Howard, because means for accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system, would enable the method because, "Accordingly, the amount of data transmitted between the client and the storage may be reduced. Furthermore, client locking of blocks during updating may be eliminated", (see Howard, paragraph 24).

As to claim 10, Kazar et al. as modified teaches wherein the metadata includes any one of:

at least one shadow inode and at least one data block referenced by a disk address in a shadow inode (see Kazar et al., paragraphs 74 and 79-80).

As to claim 11, Kazar et al. as modified teaches the system further comprising:

means for updating the metadata of the specified file system snapshot in accordance with modifications to at least one source file corresponding to the first specified file system snapshot (see Kazar et al., paragraphs 60 and 87).

As to claim 14, Kazar et al. teaches a system for retrieving snapshot data (see abstract and paragraph 100), comprising:

means for accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one inode comprising at least one ditto address, wherein the at least one ditto address refers to a data block that has a disk address in an inode associated with one of a more recent snapshot and a source file system (see paragraphs 68-69 and 71);

means for determining if a data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot (see paragraph 68);

means for copying, in response to determining the data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot, the data block to be modified into the specified snapshot (see paragraphs 20-21, 70, 73-75 and 79-80);

means for copying the data (block to be modified into a next oldest file system snapshot (see paragraphs 69); and

means for modifying the data block copied into the specified snapshot (see paragraphs 69).

As to claim 15, Kazar et al. teaches the system further comprising:

means for reading an indirect block referenced by the disk address and at least one data block referenced by at leas; one disk address in the indirect block (see paragraphs 74 and 79-80).

As to claim 16, Kazar et al. teaches the system further comprising:

means for accessing one of a more recent snapshot dataset and the source file system to red the metadata (see paragraph 60).

As to claim 17, Kazar et al. teaches a computer readable medium including computer instructions for updating a file system snapshot (see abstract and paragraph 87), the computer instructions comprising instructions for:

determining if an inode to be modified in the specified snapshot is an empty inode (see figure 1 and paragraphs 82 and 84);

copying, in response to determining a inode to be modified is an empty inode, metadata corresponding to the inode to be modified into the inode to be modified (see figures 1 and 8-9 and paragraphs 20-21, 73, and 85);

writing the metadata into a next oldest file system snapshot (see paragraph 69); and

modifying the metadata copied into the inode to be modified (see paragraph 55).

Kazar et al. does not teach accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

Howard teaches object-based storage device with improved reliability and fast crash recovery (see abstract), in which he teaches accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system

snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system (see paragraphs 7 and 24).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., to include accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Kazar et al., by the teaching of Howard, because accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system, would enable the method because, "Accordingly, the amount of data transmitted between the client and the storage may be reduced. Furthermore, client locking of blocks during updating may be eliminated", (see Howard, paragraph 24).

As to claim 18, Kazar et al. as modified teaches wherein the metadata includes any one of:

at least one shadow inode and at least one data block referenced by a disk address in a shadow inode (see Kazar et al., paragraphs 60 and 68).

As to claim 22, Kazar et al. teaches a computer readable medium including computer instructions for retrieving snapshot data, the computer instructions comprising (see abstract and paragraph 87) instructions for:

accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one inode comprising at least one ditto address, wherein the at least one ditto address refers to a data block that has a disk address in an inode associated with one of a more recent snapshot and a source file system (see paragraphs 68-69 and 71);

determining if a data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot (see paragraph 68);

copying, in response to determining the data block to be modified is referenced by a ditto address in an inode of the specked file system snapshot, the data block to be modified into the specified snapshot (see paragraphs 20-21, 70, 73-75, and 79-80);

copying the data block to be modified into a next oldest file system snapshot (see paragraph 69); and

modifying the data block copied into the specified snapshot (see paragraph 69).

As to claim 25, Kazar et al. teaches a system for updating a file system snapshot (see abstract and paragraph 100), comprising:

a first file system snapshot in a plurality of file system snapshots, wherein the first file system snapshot includes data contents (see figure 1 and paragraphs 82 and 874);

data contents of the first file system snapshot, wherein the data contents comprises at least one of an empty inode and are inode comprising at least one ditto address (see figure 1 and paragraphs 82 and 874),

wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system (see paragraphs 82 and 84), and

wherein a ditto address refers to a data block that has a disk address in an inode associated with once of the more recent snapshot, and a source file system (see paragraphs 68-69 and 71); and

means for writing the data contents to a next oldest file system snapshot (see paragraph 69).

As to claim 26, Kazar et al. teaches wherein the data contents includes any one of:

at least one shadow inode, at least one indirect block referenced by a shadow inode and at least one data block referenced by a disk address in an indirect block (see paragraphs 74 and 79-80); and

at least one shadow inode (see paragraph 22).

As to claim 27, Kazar et al. teaches the system further comprising:

a next most recent file system snapshot (see paragraph 87);

data contents of the next most recent file system snapshot, wherein the data contents includes any one of:

at least one shadow inode and at least one data block referenced by a disk address in a shadow inode (see paragraphs 60 and 68); and

at least one shadow inode, and means for writing the data contents to the first file system snapshot (see paragraphs 22, 60 and 69).

As to claim 28, Kazar et al. teaches a system for retrieving snapshot data (see abstract), comprising:

a shadow inode in a first snapshot dataset corresponding to a source file, the shadow inode comprising at least one of an empty inode and an inode comprising at least one implied reference (see figure 1 and paragraphs 82 and 84),

wherein an empty inode indicates that an metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system, and wherein an implied reference refers to a data block that has a disk address in an inode associated with one of the more recent snapshot, and a source file system (see figure 1 and paragraphs 82 and 84); and

a next most recent snapshot dataset (see paragraph 87).

As to claim 29, Kazar et al. teaches the system further comprising:

an indirect block referenced by the disk address (see paragraphs 60 and 68); and

at least one data block referenced by at least one disk address in the indirect block (see paragraphs 74 and 79-80).

As to claim 30, Kazar et al. teaches the system further comprising:

a next most recent snapshot dataset having a different ancestor as the first snapshot dataset (see paragraphs17-18).

Response to Arguments

4. Applicant's arguments filed 22- November- 2004 with respect to the rejected claims in view of the cited references have been fully considered but they are not found persuasive:

In response to applicants' arguments that "Lewis et al., does not even mention or suggest modifying a snapshot", the arguments have been fully considered but are not deemed persuasive, because Kazar et al. teaches "The following describes how the inode layer 18 described above is implemented in terms of disk structures. Aside from the read and write operations described above, the inode structures described here also allow copy-on-write snapshots of inodes. The copy-on-write inodes look like they have a copy of the data stored in the original inode, but store only the differences between the original and the new inode. These can allow backups and snapshots to be performed without using much additional disk space", (see Kazar et al., paragraph 60).

In response to applicants' arguments that "Lewis et al. fail to disclose, empty inodes, implied references and modifying empty inodes and referenced data blocks within a specified snapshot", the arguments have been fully considered but are not deemed persuasive, because Howard teaches a source file in the first file system, wherein the snapshot data set is substantially empty and comprises at least one shadow inode (see paragraphs 7 and 24), Howard specifically teaches each object is zero or more bytes that corresponds to substantially empty, also it is noted that inode itself may be stored in a file as the inode file, the inode characteristics including file ID is an inode number identifying an inode corresponding to a file, also includes pointers to each block storing the file data, inode may also include various file attributes (see paragraph 38).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Belix M. Ortiz whose telephone number is571-272-4081. The examiner can normally be reached on moday-friday 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on571-272-4083. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

bmo

March 3, 2005

SAM RIMELL
PRIMARY EXAMINER